



(19)

(11) Publication number:

0709080

Generated Document.

PATENT ABSTRACTS OF JAPAN(21) Application number: **05239775**(51) Intl. Cl.: **E01C 5/22**(22) Application date: **27.09.93**

(30) Priority:

(43) Date of application
publication: **04.04.95**(84) Designated contracting
states:(71) Applicant: **MINO DORO KK**(72) Inventor: **HYODO ISAO**

(74) Representative:

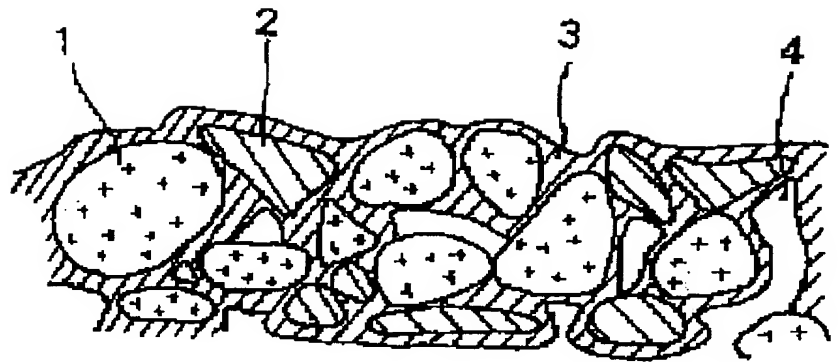
**(54) PAVING MATERIAL
FOR CIVIL ENGINEERING
AND CONSTRUCTION**

(57) Abstract:

PURPOSE: To provide an easy-repairing paving material easy for construction and without a fear of fading and uneven settling after construction by blending colored glass and fluorescent colored glass of specific grain size with epoxy resin of a specific weight ratio.

CONSTITUTION: Colored glass 1 and fluorescent colored glass 2 of grain size 2-10 mm are prepared as a dry aggregate. Sufficiently dried industrial waste glass is used so as to effectively utilize industrial waste. First, the colored glass 1 and the fluorescent colored glass 2 to be the aggregate are mixed with each other by dry mixing of a mixer. Epoxy resin 3 of a weight ratio 6-12% as a binder is blended with the mixed aggregate. On a road surface previously cleaned, a form is laid. Inside of this form, a paving material mixed by the mixer is laid and leveled, and a surface thereof is trowel-finished. By curing to cure the epoxy resin 3, a pavement surface is obtained.

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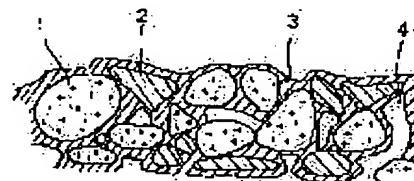
(21)Application number : 05-239775 (71)Applicant : MINO DORO KK
 (22)Date of filing : 27.09.1993 (72)Inventor : HYODO ISAO

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LEGAL STATUS

[Date of request for examination] 27.09.1993

[Date of sending the examiner's decision of rejection] 23.01.1996

[Kind of final disposal of application other than the examiner's decision of rejection or application converted registration]

[Date of final disposal for application]

[Patent number]

[Date of registration]

[Number of appeal against examiner's decision of rejection]

[Date of requesting appeal against examiner's decision of rejection]

[Date of extinction of right]

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CLAIMS

[Claim(s)]

[Claim 1] the aggregate with which grain size consists of the colored glass and fluorescence colored glass which are 2-10mm, and a weight ratio -- the engineering works and structural pavement material of which the binder which consists of 6 - 12% of epoxy system resin is blended, pastes up, and consists.

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DETAILED DESCRIPTION

[Detailed Description of the Invention]

[0001]

[Industrial Application] This invention relates to the engineering works and structural pavement material for forming the pavement side where coloring was given in a domestic door dirt floor, a veranda, Poti, or a wallplate the circumference of a foot walk, a footbridge, a park, a sport facility, and a building.

[0002]

[Description of the Prior Art] Although paving with cement or asphalt in construction of a foot walk conventionally is generally performed, peacefulness and a calm living environment come to be searched for recently, and the environment assessment which adopted unreserved concrete or not asphalt but color also by the road is required increasingly.

[0003] Although performing color paint to a pavement side, or adding a pigment to a roadbed and paving to such a demand was made, there was a fault of being easy to fade and there was a problem that color matching was difficult, at the time of repair. Moreover, there was a fault that the activity of setting up a datum line in case the problem of starting a differential settlement is after construction and these are arranged although there is also a method of covering with the colored brick or a block, or making it correspond to the location to lay and cutting brick and the edge of a block took time and effort.

[0004] On the other hand, processing of **** glass, such as a carboy discharged, poses a problem from each home and works recently, and to utilize effectively the **** glass which needs a large amount of cost for disposal as incombustibles was desired. Using such **** glass for pavement material, such as a road, is not yet made.

[0005]

[Problem(s) to be Solved by the Invention] While this invention can be made in view of such a situation, and the place made into the purpose is easy to construct, and there is neither fading after construction nor worries about a differential settlement, also being able to perform repair easily and being able to give various coloring and a pattern, it is in offering engineering works and structural pavement material excellent in water permeability and corrosion resistance. Furthermore, in this invention, it aims at offering the engineering works and structural pavement material which raised fanciness and safety by taking in a fluorescent pigment.

[0006]

[Means for Solving the Problem] namely, -- as above-mentioned The means for solving a technical problem -- this invention -- "-- the aggregate with which grain size consists of the colored glass and fluorescence colored glass which are 2-10mm, and a weight ratio -- the engineering works and structural pavement material" of which the binder which consists of 6 - 12% of epoxy system resin is blended, pastes up, and consists are made into the contents.

[0007] The thing which ground **** glass, such as a carboy discharged from each home and works, and the thing which made commercial colored glass mix in this suitably can be used for the colored glass used for the pavement material of this invention. What colored the front face by the screen-stencil which is not decolored may be used for colored glass, including clear glass and natural glass.

[0008] The thing which colored the fluorescent pigment the above-mentioned ** waste glass, or the thing which colored the fluorescent pigment commercial clear glass can be used for the fluorescence colored glass used for the pavement material of this invention. A fluorescent pigment may have the thing of various coloring, and the class may be an organic fluorescent pigment, or may be an inorganic fluorescent pigment.

[0009] In this invention, since as for corresponding to the configuration of a pavement substrate freely, that it is the structure which the pavement side equipped with water permeability, and the epoxy system resin used as a binder an adhesive property is good and thin surfacing does not exfoliate, either, as for the grain size of the colored glass used as the aggregate, and fluorescence colored glass, 2-10mm is suitable.

[0010] The epoxy system resin used as a binder has the advantage which is good, excels [adhesive property] in thermal stability, and is excellent in abrasion resistance, oilproof, and a water resisting property. [of an adhesive

property with the cement used as a substrate, asphalt, a steel floor plate, etc.] Since the epoxy system resin used for the pavement material of this invention is prepared in an initial-complement site according to the construction situation of a site, what mixes and stiffens base resin and a curing agent (amine system) is desirable. In addition, since the setting time is changeable with the rate of a compounding ratio of base resin and a curing agent, it can construct according to the weather and atmospheric temperature at the time of construction. Moreover, it can be made to often follow in footsteps of a substrate like [it is possible to create the epoxy system resin which has suitable pliability with the rate of a compounding ratio of base resin and a curing agent, and] the steel floor plate expanded and contracted by change of atmospheric temperature.

[0011] 6 - 12% of heavy quantitative ratios of combination of epoxy system resin is desirable. It is because less than 6% is not enough as junction of the aggregates, reinforcement becomes weak, and it will become difficult to give water permeability as a result of filling the clearance between the aggregates if 12% is exceeded. for this reason, epoxy system resin -- liquid -- it is good to blend with the condition of adhering to extent which who does not produce on the surface of the aggregate.

[0012] In addition, in this invention, in order to give reinforcement, ballast may be mixed to the aggregate. in this case, ballast is as homogeneous as colored glass, when grain size uses a thing comparable as colored glass -- it mixes and doubling becomes possible. Moreover, grain size can respond to the configuration of a pavement substrate freely by using ballast comparable as colored glass, and can form the pavement side of the structure equipped with water permeability. Although ballast does not ask the class of a river gravel, a pit gravel, sea gravel, etc., in order that it may raise an adhesive property with a binder, as for impurities, such as a viscosity lump, what was removed by washing in cold water is desirable.

[0013] Moreover, silicon sand may also be included in pavement material. the front face of the epoxy system resin which hardened silicon sand -- the shape of rough skin -- forming -- slipping of epoxy system resin -- stopping -- there is *****. 5 - 10% of heavy quantitative ratios of combination of this silicon sand is desirable:

[0014] [Function] ***** which epoxy system resin plays the role of the adhesives of colored glass and fluorescence colored glass, and the pavement material concerning this invention wraps in sharp glass to coincidence, and secure: safety is carried out. The pavement side given to various coloring and a pattern by changing the class of colored glass and fluorescence colored glass can be formed easily, and the pavement side which did not fade even if a long period of time passed further, and was excellent in water permeability and corrosion resistance can be formed. Moreover, since a pavement side is formed with the zygote joined uniformly, unlike the pavement side of a block depended for covering, it does not start a differential settlement.

[0015] Furthermore, since fluorescence colored glass is used, if it colors by the light from the outside, fanciness increases and it applies to the pavement side of the foot walk of a road, and the entrance of a stairway and a parking lot, attention can be called to a walk of people and receipts and payments of a vehicle, and safety can be raised. Since it was easy to attract attention of the public notice since light was well emitted to the strong dark light source of the ultraviolet rays called the so-called black light, and fluorescence colored glass has entered the pavement side in the state of distribution in this invention, especially fluorescence colored glass tends to call nearby attention by this.

[0016]

[Example] Drawing 1 is drawing which expressed the pavement material concerning this invention typically. As shown in this drawing, colored glass 1 and the fluorescence coloring 2 are joined with the epoxy system resin 3 which is a binder mutually, colored glass 1, fluorescence colored glass 2, and in between, the clearance 4 which is not filled with epoxy system resin 3 is formed, and it has structure which lets water pass. Pavement material can choose construction area and construction thickness freely, and can apply them to various substrates, and since it is the transparent body even if epoxy system resin itself hardens, it can form the pavement side excellent in water permeability and corrosion resistance while it can form the pavement side of coloring of ***** versatility, or a pattern which loomed the color of colored glass as it is.

[0017] Next, if the pavement approach which uses such pavement material is explained, as shown in drawing 2, as the desiccation aggregate, colored glass with a grain size of 2-10mm and fluorescence colored glass are prepared, by the predetermined blending ratio of coal, it will apply to a mixer and empty kneading will be carried out. In order to make the epoxy system resin and fitness used as a binder paste, and in order for the aggregate to prevent epoxy system resin milking with moisture at the time of hardening, it is good to use what was dried well. When using ***** glass for colored glass, it is good to prepare what classified beforehand and was ground for every color. The same is said of fluorescence colored glass.

[0018] By empty kneading by the mixer, if the colored glass and fluorescence colored glass used as the aggregate are mixed, the epoxy system resin which carried out mixed stirring of base resin and the curing agent as a binder will be added to this, silicon sand will be added as a filler if needed, and all will be mixed well (mixer mixing).

[0019] On the other hand, a substrate is cleaned beforehand, and removes and dries dust etc. (substrate cleaning). It

is for improving adhesion of a roadbed. Next, the part which covers with and levels a roadbed is enclosed with shuttering (shuttering activity). A tack coat is processing for carrying out that precede a roadbed covering and leveling and it is easy to paste up a roadbed on a substrate, and is processing which applies to a substrate side the liquid which diluted the epoxy system resin used as a binder with solvents, such as an acetone. What is necessary is just to perform this tack coat if needed according to the condition of a substrate.

[0020] If a substrate is ready, the roadbed by which mixer mixing was carried out is covered with and leveled into the part enclosed with the shuttering on a substrate (carrying out roadbed *****). And the front face of a roadbed covered with and leveled is pressed down and finished by ** (trowel finishing). In the case of thin surfacing, since a roadbed adheres to a roller front face, finishing with a roller etc. is not desirable. After finishing by **, a pavement side is formed by making oneself recuperate and stiffening epoxy system resin.

[0021] The pavement material concerning this invention can be used also as a wallplate. In this case, the aggregate which contains colored glass and fluorescence colored glass in the shuttering of predetermined magnitude beforehand, and the epoxy system resin used as a binder can be mixed, the pavement material of given thickness can be created, and this can be constructed by pasting furring material in a site. In addition, the adhesion to furring material may use the epoxy system resin used for the binder, and may use other resin systems and elastomeric adhesive.

[0022]

[Effect of the Invention] As explained above, according to the pavement approach concerning this invention, it has the following effectiveness.

1. There is neither fading after construction nor worries about a differential settlement, repair can also be performed easily, and while being able to form easily the pavement side given to various coloring and a pattern, the pavement side excellent in water permeability and corrosion resistance can be formed.
2. Construction area and construction thickness can be chosen freely and it can apply to various substrates, and make it correspond to the location to lay unlike the approach of covering with the conventional brick or a block, and don't require the troublesome activity of cutting brick and the edge of a block, but construction is easy.
3. By having used fluorescence colored glass, by raising fanciness and applying to a road surface, a foot walk, etc. of a curve part of a stairway public inside a garden or a road, people's attention can be made to be able to call and safety can be raised.
4. The effectiveness which can utilize effectively further the **** glass which needs a large amount of cost for disposal as incombustibles, and contributes to industry is size.

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TECHNICAL FIELD

[Industrial Application] This invention relates to the engineering works and structural pavement material for forming the pavement side where coloring was given in a domestic door dirt floor, a veranda, Poti, or a wallplate the circumference of a foot walk, a footbridge, a park, a sport facility, and a building.

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PRIOR ART

[Description of the Prior Art] Although paving with cement or asphalt in construction of a foot walk conventionally is generally performed, peacefulness and a calm living environment come to be searched for recently, and the environment assessment which adopted unreserved concrete or not asphalt but color also by the road is required increasingly.

[0003] Although performing color paint to a pavement side, or adding a pigment to a roadbed and paving to such a demand was made, there was a fault of being easy to fade and there was a problem that color matching was difficult, at the time of repair. Moreover, there was a fault that the activity of setting up a datum line in case the problem of starting a differential settlement is after construction and these are arranged although there is also a method of covering with the colored brick or a block, or making it correspond to the location to lay and cutting brick and the edge of a block took time and effort.

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TECHNICAL PROBLEM

[Problem(s) to be Solved by the Invention] While this invention can be made in view of such a situation, and the place made into the purpose is easy to construct, and there is neither fading after construction nor worries about a differential settlement, also being able to perform repair easily and being able to give various coloring and a pattern, it is in offering engineering works and structural pavement material excellent in water permeability and corrosion resistance. Furthermore, in this invention, it aims at offering the engineering works and structural pavement material which raised fanciness and safety by taking in a fluorescent pigment.

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MEANS

[Means for Solving the Problem] namely, -- as above-mentioned The means for solving a technical problem -- this invention -- "-- the aggregate with which grain size consists of the colored glass and fluorescence colored glass which are 2-10mm, and a weight ratio -- the engineering works and structural pavement material" of which the binder which consists of 6 - 12% of epoxy system resin is blended, pastes up, and consists are made into the contents.

[0007] The thing which ground **** glass, such as a carboy discharged from each home and works, and the thing which made commercial colored glass mix in this suitably can be used for the colored glass used for the pavement material of this invention. What colored the front face by the screen-stencil which is not decolored may be used for colored glass, including clear glass and natural glass.

[0008] The thing which colored the fluorescent pigment the above-mentioned ** waste glass, or the thing which colored the fluorescent pigment commercial clear glass can be used for the fluorescence colored glass used for the pavement material of this invention. A fluorescent pigment may have the thing of various coloring, and the class may be an organic fluorescent pigment, or may be an inorganic fluorescent pigment.

[0009] In this invention, since as for corresponding to the configuration of a pavement substrate freely, that it is the structure which the pavement side equipped with water permeability, and the epoxy system resin used as a binder an adhesive property is good and thin surfacing does not exfoliate, either, as for the grain size of the colored glass used as the aggregate, and fluorescence colored glass, 2-10mm is suitable.

[0010] The epoxy system resin used as a binder has the advantage which is good, excels [adhesive property] in thermal stability, and is excellent in abrasion resistance, oilproof, and a water resisting property. [of an adhesive property with the cement used as a substrate, asphalt, a steel floor plate, etc.] Since the epoxy system resin used for the pavement material of this invention is prepared in an initial-complement site according to the construction situation of a site, what mixes and stiffens base resin and a curing agent (amine system) is desirable. In addition, since the setting time is changeable with the rate of a compounding ratio of base resin and a curing agent, it can construct according to the weather and atmospheric temperature at the time of construction. Moreover, it can be made to often follow in footsteps of a substrate like [it is possible to create the epoxy system resin which has suitable pliability with the rate of a compounding ratio of base resin and a curing agent, and] the steel floor plate expanded and contracted by change of atmospheric temperature.

[0011] 6 - 12% of heavy quantitative ratios of combination of epoxy system resin is desirable. It is because less than 6% is not enough as junction of the aggregates, reinforcement becomes weak, and it will become difficult to give water permeability as a result of filling the clearance between the aggregates if 12% is exceeded. for this reason, epoxy system resin -- liquid -- it is good to blend with the condition of adhering to extent which who does not produce on the surface of the aggregate.

[0012] In addition, in this invention, in order to give reinforcement, ballast may be mixed to the aggregate. in this case, ballast is as homogeneous as colored glass, when grain size uses a thing comparable as colored glass -- it mixes and doubling becomes possible. Moreover, grain size can respond to the configuration of a pavement substrate freely by using ballast comparable as colored glass, and can form the pavement side of the structure equipped with water permeability. Although ballast does not ask the class of a river gravel, a pit gravel, sea gravel, etc., in order that it may raise an adhesive property with a binder, as for impurities, such as a viscosity lump, what was removed by washing in cold water is desirable.

[0013] Moreover, silicon sand may also be included in pavement material. the front face of the epoxy system resin which hardened silicon sand -- the shape of rough skin -- forming -- slipping of epoxy system resin -- stopping -- there is *****. 5 - 10% of heavy quantitative ratios of combination of this silicon sand is desirable.

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OPERATION

[Function] ***** which epoxy system resin plays the role of the adhesives of colored glass and fluorescence colored glass, and the pavement material concerning this invention wraps in sharp glass to coincidence, and secure safety is carried out. The pavement side given to various coloring and a pattern by changing the class of colored glass and fluorescence colored glass can be formed easily, and the pavement side which did not fade even if a long period of time passed further, and was excellent in water permeability and corrosion resistance can be formed. Moreover, since a pavement side is formed with the zygote joined uniformly, unlike the pavement side of a block depended for covering, it does not start a differential settlement.

[0015] Furthermore, since fluorescence colored glass is used, if it colors by the light from the outside, fanciness increases and it applies to the pavement side of the foot walk of a road, and the entrance of a stairway and a parking lot, attention can be called to a walk of people and receipts and payments of a vehicle, and safety can be raised. Since it was easy to attract attention of the public notice since light was well emitted to the strong dark light source of the ultraviolet rays called the so-called black light, and fluorescence colored glass has entered the pavement side in the state of distribution in this invention, especially fluorescence colored glass tends to call nearby attention by this.

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EXAMPLE

[Example] Drawing 1 is drawing which expressed the pavement material concerning this invention typically. As shown in this drawing, colored glass 1 and the fluorescence coloring 2 are joined with the epoxy system resin 3 which is a binder mutually, colored glass 1, fluorescence colored glass 2, and in between, the clearance 4 which is not filled with epoxy system resin 3 is formed, and it has structure which lets water pass. Pavement material can choose construction area and construction thickness freely, and can apply them to various substrates, and since it is the transparent body even if epoxy system resin itself hardens, it can form the pavement side excellent in water permeability and corrosion resistance while it can form the pavement side of coloring of **** versatility, or a pattern which loomed the color of colored glass as it is.

[0017] Next, if the pavement approach which uses such pavement material is explained, as shown in drawing 2, as the desiccation aggregate, colored glass with a grain size of 2-10mm and fluorescence colored glass are prepared, by the predetermined blending ratio of coal, it will apply to a mixer and empty kneading will be carried out. In order to make the epoxy system resin and fitness used as a binder paste, and in order for the aggregate to prevent epoxy system resin milking with moisture at the time of hardening, it is good to use what was dried well. When using **** glass for colored glass, it is good to prepare what classified beforehand and was ground for every color. The same is said of fluorescence colored glass.

[0018] By empty kneading by the mixer, if the colored glass and fluorescence colored glass used as the aggregate are mixed, the epoxy system resin which carried out mixed stirring of base resin and the curing agent as a binder will be added to this, silicon sand will be added as a filler if needed, and all will be mixed well (mixer mixing).

[0019] On the other hand, a substrate is cleaned beforehand, and removes and dries dust etc. (substrate cleaning). It is for improving adhesion of a roadbed. Next, the part which covers with and levels a roadbed is enclosed with shuttering (shuttering activity). A tack coat is processing for carrying out that precede a roadbed covering and leveling and it is easy to paste up a roadbed on a substrate, and is processing which applies to a substrate side the liquid which diluted the epoxy system resin used as a binder with solvents, such as an acetone. What is necessary is: just to perform this tack coat if needed according to the condition of a substrate.

[0020] If a substrate is ready, the roadbed by which mixer mixing was carried out is covered with and leveled into the part enclosed with the shuttering on a substrate (carrying out roadbed *****). And the front face of a roadbed covered with and leveled is pressed down and finished by ** (trowel finishing). In the case of thin surfacing, since a roadbed adheres to a roller front face, finishing with a roller etc. is not desirable. After finishing by **, a pavement side is formed by making oneself recuperate and stiffening epoxy system resin.

[0021] The pavement material concerning this invention can be used also as a wallplate. In this case, the aggregate which contains colored glass and fluorescence colored glass in the shuttering of predetermined magnitude beforehand, and the epoxy system resin used as a binder can be mixed, the pavement material of given thickness can be created, and this can be constructed by pasting furring material in a site. In addition, the adhesion to furring material may use the epoxy system resin used for the binder, and may use other resin systems and elastomeric adhesive.

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DESCRIPTION OF DRAWINGS

[Brief Description of the Drawings]

[Drawing 1] It is drawing which expressed the pavement material concerning this invention typically.

[Drawing 2] It is the flow chart which shows an example of the pavement approach of this invention.

[Description of Notations]

1 Colored Glass

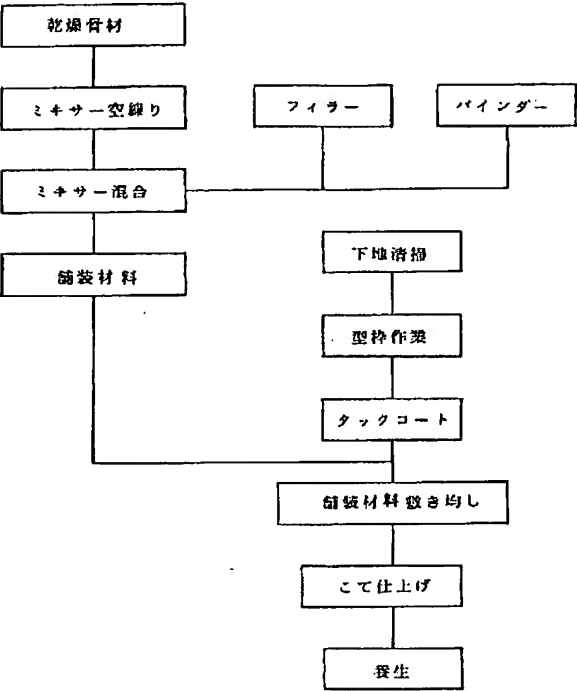
2 Fluorescence Colored Glass

3 Epoxy System Resin

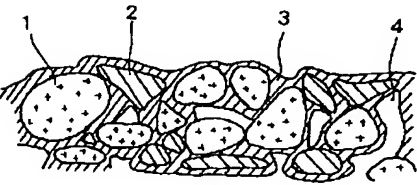
4 Clearance

[Translation done.]

Drawing selection drawing 2



[Translation done.]



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